

REMARKS

This paper is filed in response to the non-final Office action mailed on June 18, 2008. Claims 63-67 and 74-78 are canceled herewith, leaving claims 68-73 and 79-90 pending in the application. Applicant appreciates the Examiner's allowance of claims 85-88 and his indication that claims 65, 67, 71, 73, 76, 78, 82, and 84 recite allowable subject matter. In view of the foregoing amendments and following comments, Applicant respectfully requests reconsideration and allowance of all pending claims.

Many of the claims presented herewith have been amended to correct informal errors. More specifically, the claims have been amended to correct lack of antecedent basis. These amendments do not present new matter, and therefore consideration and entry of the claim amendments are respectfully requested.

In addition, independent claims 68, 79, 89, and 90 are amended to recite a direct expansion geothermal heat exchange system or method in which a refrigerant has a charge sufficient to obtain a head pressure in the cooling mode of approximately 305-405 psi, and a suction pressure in the heating mode of approximately 80-160 psi. Support for this claim language is found on page 37, paragraph [88], of the originally filed specification. Accordingly, consideration and entry of these amendments are respectfully requested.

Turning to the Office action, claims 63, 74, 89, and 90 stand rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 5,671,608 ("Wiggs") in view of U.S. Patent No. 6,390,183 ("Aoyagi"). Applicant respectfully traverses this ground of rejection.

Independent claims 63 and 74 have been canceled, and therefore the rejection is moot with respect to these claims.

Each of independent claims 89 and 90 specifies a direct expansion geothermal heat exchange method and system, respectively, having a cooling mode and a heating mode. The method and system include an interior air heat exchanger and an exterior, subterranean heat exchanger, the exterior heat exchanger including heat exchange tubing, at least a portion of the heat exchange tubing having a subterranean depth of approximately 100-300 feet. The system is charged with an R-410A refrigerant until the refrigerant has a head pressure in the cooling mode

of approximately 305-405 psi, and a suction pressure in the heating mode of approximately 80-160 psi.

The proposed combination of Wiggs and Aoyagi fails to disclose or suggest a direct expansion geothermal heat exchange system or method having a refrigerant charge having a head pressure in the cooling mode of approximately 305-405 psi, and a suction pressure in the heating mode of approximately 80-160 psi.

The primary reference to Wiggs discloses a direct expansion system using conventional refrigerant, and therefore uses conventional operating pressures in the heating and cooling modes. More specifically, a conventional R-22 system will typically have a head pressure in the cooling mode of approximately 200-250 psi, and a suction pressure in the heating mode of approximately 50-70 psi. Accordingly, Wiggs fails to disclose or suggest the refrigerant charge parameters as specified in claims 89 and 90.

The secondary reference to Aoyagi fails to provide the deficiency in Wiggs noted above. While Aoyagi acknowledges the use of R-410A refrigerant in a heat exchange system, it fails to disclose or suggest the refrigerant charge parameters specified in the claims.

In fact, Aoyagi teaches away from charging or operating a heat exchange system at refrigerant pressures greater than those used with conventional R-22 refrigerant. Instead, Aoyagi teaches that pressure loss experienced by refrigerant flowing through the heat exchanger should be minimized. Specifically, Aoyagi states that the refrigerant should have a greater density so that a lower refrigerant flow velocity may be used to achieve the same operational abilities as conventional R-22. The lower refrigerant flow velocity, in turn, reduces fluid pressure loss, which is the stated goal of Aoyagi. Aoyagi also specifically teaches that the refrigerant charge should be reduced. (Col. 3, lines 44-47, and Col. 4, lines 16-18) The net effect of these teachings in Aoyagi is a refrigerant having lower operational pressures than systems using conventional R-22 refrigerant. One of ordinary skill in the art, therefore, would not be motivated by Aoyagi to use a refrigerant at elevated pressures, and therefore independent claims 89 and 90 are patentable over the cited prior art.

Turning to the rejection of claims 68 and 79, the Office action fails to clearly state what prior art is being applied against the claims. The bottom of page 2 of the Office action simply states that:

Claims 68 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable between 50 psi and 180 psi could be provided in order to run a direct expansion heat pump system.

The rejection as stated fails to identify the art being applied or to address each element of the claims it purports to reject. Accordingly, this rejection must be withdrawn or a new, non-final Office action must be issued in which the specifics of this rejection are provided.¹

The Office action further fails to identify the status of some of the currently pending claims, and therefore Applicant requests the Examiner to either acknowledge these claims as allowable or to issue a new, non-final Office action that specifically addresses these claims. More specifically, claims 72, 83, and 85 have not been rejected nor have they been indicated as allowable. A further, non-final communication clarifying the status of these claims is respectfully requested.

In view of the foregoing, independent claims 68, 79, 89, and 90, as well as claims 69-73 and 80-84 depending therefrom, are patentable over the cited prior art, and therefore the rejection thereof must be withdrawn. Accordingly, reconsideration and allowance of claims 68-73 and 79-90 as pending in the present application are respectfully requested.

CONCLUSION

It is submitted that the present application is in good and proper form for allowance. A favorable action on the part of the Examiner is respectfully solicited. If, in the opinion of the Examiner, a telephone conference would expedite prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

¹ It is possible to infer from other portions of the office action that the Examiner may have intended to reject claims 68 and 79 over a combination of the aforementioned Wiggs in view of U.S. Patent No. 6,892,522 ("Brasz"). The Office action, however, does not specifically indicate that it is applying this combination of art, nor does it particularly point out how this combination discloses or suggests each element of the claims, and therefore Applicant will refrain from commenting on that art at this time. Applicant notes that claims 68 and 79 are amended herein to recite specific head and suction pressure ranges that appear to distinguish those claims from the cited prior art.

Appl. No. 10/757,265
Amdt. dated Nov. 25, 2008
Reply to Office action of Jun. 18, 2008

The Patent Office is hereby authorized to credit any overpayment or charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith to our Deposit Account No. 50-3629.

Respectfully submitted,
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